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Atty. Docket No: DX0882XK
Date Mailed: October 19, 2001
Inventor(s): Wei WANG, et al.
Serial No.: 09/898,751
Filed: July 2, 2001



Title: CHEMOKINE AND RECEPTOR USES; COMPOSITIONS; METHODS

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<110> Oldham, Elizabeth K.
 Soto, Hortensia
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 Kellerman, Sirid-Aimee
 McEvoy, Leslie M.
 Bowman, Edward P.
 Zlotnik, Albert



<120> CHEMOKINE AND RECEPTOR USES; COMPOSITIONS; METHODS

<130> DX0882XK

<140> US09/898,751

<141> 2001-07-02

<150> US09/471,549

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<151> 1999-05-27

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<151> 1998-12-24

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<170> PatentIn version 3.1

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| 1 5 10 15 | |

| | |
|---|----|
| gat gaa gag gac gca tac tcg gct gag cca ctg ccg gag ctt tgc tac | 96 |
| Asp Glu Glu Asp Ala Tyr Ser Ala Glu Pro Leu Pro Glu Leu Cys Tyr | |
| 20 25 30 | |

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|---|-----|
| aag gcc gat gtc cag gcc ttc agc cgg gcc ttc caa ccc agt gtc tcc | 144 |
| Lys Ala Asp Val Gln Ala Phe Ser Arg Ala Phe Gln Pro Ser Val Ser | |
| 35 40 45 | |

| | |
|---|-----|
| ctg acg ctg gct gcg ctg ggt ctg gcc ggc aat ggc ctg gtc ctg gcc | 192 |
| Leu Thr Leu Ala Ala Leu Gly Leu Ala Gly Asn Gly Leu Val Leu Ala | |
| 50 55 60 | |

| | |
|--|-----|
| acc cac ctg gca gcc cga cgc gca gcg cgc tcg ccc acc tct gcc cac | 240 |
| Thr His Leu Ala Ala Arg Arg Ala Ala Arg Ser Pro Thr Ser Ala His | |
| 65 70 75 80 | |
| ctg ctc cag ctg gcc ctg gcc gac ctc ttg ctg gcc ctg act ctg ccc | 288 |
| Leu Leu Gln Leu Ala Leu Ala Asp, Leu Leu Leu Ala Leu Thr Leu Pro | |
| 85 90 95 | |
| ttc gcg gca gca ggg gct ctt cag ggc tgg agt ctg gga agt gcc acc | 336 |
| Phe Ala Ala Ala Gly Ala Leu Gln Gly Trp Ser Leu Gly Ser Ala Thr | |
| 100 105 110 | |
| tgc cgc acc atc tct ggc ctc tac tcg gcc tcc ttc cac gcc ggc ttc | 384 |
| Cys Arg Thr Ile Ser Gly Leu Tyr Ser Ala Ser Phe His Ala Gly Phe | |
| 115 120 125 | |
| ctc ttc ctg gcc tgt atc agc gcc gac cgc tac gtg gcc atc gcg cga | 432 |
| Leu Phe Leu Ala Cys Ile Ser Ala Asp Arg Tyr Val Ala Ile Ala Arg | |
| 130 135 140 | |
| gcg ctc cca gcc ggg ccg cgg ccc tcc act ccc ggc cgc gca cac ttg | 480 |
| Ala Leu Pro Ala Gly Pro Arg Pro Ser Thr Pro Gly Arg Ala His Leu | |
| 145 150 155 160 | |
| gtc tcc gtc atc gtg tgg ctg ctg tca ctg ctc ctg gcg ctg cct gcg | 528 |
| Val Ser Val Ile Val Trp Leu Leu Ser Leu Leu Leu Ala Leu Pro Ala | |
| 165 170 175 | |
| ctg ctc ttc agc cag gat ggg cag cgg gaa ggc caa cga cgc tgt cgc | 576 |
| Leu Leu Phe Ser Gln Asp Gly Gln Arg Glu Gly Gln Arg Arg Cys Arg | |
| 180 185 190 | |
| ctc atc ttc ccc gag ggc ctc acg cag acg gtg aag ggg gcg agc gcc | 624 |
| Leu Ile Phe Pro Glu Gly Leu Thr Gln Thr Val Lys Gly Ala Ser Ala | |
| 195 200 205 | |
| gtg gcg cag gtg gcc ctg ggc ttc gcg ctg ccg ctg ggc gtc atg gta | 672 |
| Val Ala Gln Val Ala Leu Gly Phe Ala Leu Pro Leu Gly Val Met Val | |
| 210 215 220 | |
| gcc tgc tac gcg ctt ctg ggc cgc acg ctg ctg gcc gcc agg ggg ccc | 720 |
| Ala Cys Tyr Ala Leu Leu Gly Arg Thr Leu Leu Ala Ala Arg Gly Pro | |
| 225 230 235 240 | |
| gag cgc cgg cgt gcg ctg cgc gtc gtg gtg gct ctg gtg gcg gcc ttc | 768 |
| Glu Arg Arg Arg Ala Leu Arg Val Val Val Ala Leu Val Ala Ala Phe | |
| 245 250 255 | |
| gtg gtg ctg cag ctg ccc tac agc ctc gcc ctg ctg ctg gat act gcc | 816 |
| Val Val Leu Gln Leu Pro Tyr Ser Leu Ala Leu Leu Leu Asp Thr Ala | |
| 260 265 270 | |
| gat cta ctg gct gcg cgc gag cgg agc tgc cct gcc agc aaa cgc aag | 864 |
| Asp Leu Leu Ala Ala Arg Glu Arg Ser Cys Pro Ala Ser Lys Arg Lys | |
| 275 280 285 | |
| gat gtc gca ctg ctg gtg acc agc ggc ttg gcc ctc gcc cgc tgt ggc | 912 |
| Asp Val Ala Leu Leu Val Thr Ser Gly Leu Ala Leu Ala Arg Cys Gly | |
| 290 295 300 | |
| ctc aat ccc gtt ctc tac gcc ttc ctg ggc ctg cgc ttc cgc cag gac | 960 |

Leu Asn Pro Val Leu Tyr Ala Phe Leu Gly Leu Arg Phe Arg Gln Asp
 305 310 315 320
 ctg cgg agg ctg cta cgg ggt ggg agc tcg ccc tca ggg cct caa ccc 1008
 Leu Arg Arg Leu Leu Arg Gly Gly Ser Ser Pro Ser Gly Pro Gln Pro 335
 325 330
 cgc cgc ggc tgc ccc cgc cgg ccc cgc ctt tct tcc tgc tca gct ccc 1056
 Arg Arg Gly Cys Pro Arg Arg Pro Arg Leu Ser Ser Cys Ser Ala Pro 350
 340 345
 acg gag acc cac agt ctc tcc tgg gac aac tag 1089
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 Lys Ala Asp Val Gln Ala Phe Ser Arg Ala Phe Gln Pro Ser Val Ser
 35 40 45
 Leu Thr Leu Ala Ala Leu Gly Leu Ala Gly Asn Gly Leu Val Leu Ala
 50 55 60
 Thr His Leu Ala Ala Arg Arg Ala Ala Arg Ser Pro Thr Ser Ala His
 65 70 75 80
 Leu Leu Gln Leu Ala Leu Ala Asp Leu Leu Leu Ala Leu Thr Leu Pro
 85 90 95
 Phe Ala Ala Ala Gly Ala Leu Gln Gly Trp Ser Leu Gly Ser Ala Thr
 100 105 110
 Cys Arg Thr Ile Ser Gly Leu Tyr Ser Ala Ser Phe His Ala Gly Phe
 115 120 125
 Leu Phe Leu Ala Cys Ile Ser Ala Asp Arg Tyr Val Ala Ile Ala Arg
 130 135 140
 Ala Leu Pro Ala Gly Pro Arg Pro Ser Thr Pro Gly Arg Ala His Leu
 145 150 155 160

Val Ser Val Ile Val Trp Leu Leu Ser Leu Leu Leu Ala Leu Pro Ala
165 170 175

Leu Leu Phe Ser Gln Asp Gly Gln Arg Glu Gly Gln Arg Arg Cys Arg
180 185 190

Leu Ile Phe Pro Glu Gly Leu Thr Gln Thr Val Lys Gly Ala Ser Ala
195 200 205

Val Ala Gln Val Ala Leu Gly Phe Ala Leu Pro Leu Gly Val Met Val
210 215 220

Ala Cys Tyr Ala Leu Leu Gly Arg Thr Leu Leu Ala Ala Arg Gly Pro
225 230 235 240

Glu Arg Arg Arg Ala Leu Arg Val Val Val Ala Leu Val Ala Ala Phe
245 250 255

Val Val Leu Gln Leu Pro Tyr Ser Leu Ala Leu Leu Leu Asp Thr Ala
260 265 270

Asp Leu Leu Ala Ala Arg Glu Arg Ser Cys Pro Ala Ser Lys Arg Lys
275 280 285

Asp Val Ala Leu Leu Val Thr Ser Gly Leu Ala Leu Ala Arg Cys Gly
290 295 300

Leu Asn Pro Val Leu Tyr Ala Phe Leu Gly Leu Arg Phe Arg Gln Asp
305 310 315 320

Leu Arg Arg Leu Leu Arg Gly Gly Ser Ser Pro Ser Gly Pro Gln Pro
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Thr Glu Thr His Ser Leu Ser Trp Asp Asn
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| tac gat gag gag gcc tat tcg gtt ggg ccg ctg cca gag ctc tgt tac Tyr Asp Glu Glu Ala Tyr Ser Val Gly Pro Leu Pro Glu Leu Cys Tyr 20 25 30 | 96 |
| aag gct gat gtc cag gct ttc agt cgg gcc ttc caa ccc agt gtc tcc Lys Ala Asp Val Gln Ala Phe Ser Arg Ala Phe Gln Pro Ser Val Ser 35 40 45 | 144 |
| ctg atg gtg gct gta ctg ggt ctg gct ggc aat ggc cta gtc ttg gcc Leu Met Val Ala Val Leu Gly Leu Ala Gly Asn Gly Leu Val Leu Ala 50 55 60 | 192 |
| acc cat ctg gca gcc aga cga act acc cga tct ccc acc tcc gtt cac Thr His Leu Ala Ala Arg Arg Thr Thr Arg Ser Pro Thr Ser Val His 65 70 75 80 | 240 |
| ctg ctc cag ttg gcc ctg gct gac ctt tta ttg gcc ctg act ttg cct Leu Leu Gln Leu Ala Leu Ala Asp Leu Leu Leu Ala Leu Thr Leu Pro 85 90 95 | 288 |
| ttt gct gca gca ggg gct ctt cag ggc tgg aat cta gga agt acc acc Phe Ala Ala Ala Gly Ala Leu Gln Gly Trp Asn Leu Gly Ser Thr Thr 100 105 110 | 336 |
| tgc cgt gcc atc tca ggc ctc tac tcg gcc tct ttc cac gct ggc ttc Cys Arg Ala Ile Ser Gly Leu Tyr Ser Ala Ser Phe His Ala Gly Phe 115 120 125 | 384 |
| ctc ttc cta gcc tgt atc agc gcc gac cgc tat gtg gcc atc gca cga Leu Phe Leu Ala Cys Ile Ser Ala Asp Arg Tyr Val Ala Ile Ala Arg 130 135 140 | 432 |
| gct ctc cca gcc ggg cag cgg ccc tca acg cct agc cga gcg cac ttg Ala Leu Pro Ala Gly Gln Arg Pro Ser Thr Pro Ser Arg Ala His Leu 145 150 155 160 | 480 |
| gtt tca gtc ttc gtg tgg ctg ttg gcg ctg ttt ctg gct cta cct gcg Val Ser Val Phe Val Trp Leu Leu Ala Leu Phe Leu Ala Leu Pro Ala 165 170 175 | 528 |
| ctc ctt ttc agc cgg gac ggg cca cgt gaa ggc caa cga cgc tgt cgg Leu Leu Phe Ser Arg Asp Gly Pro Arg Glu Gly Gln Arg Arg Cys Arg 180 185 190 | 576 |
| ctc att ttt ccc gaa agc ctc acg cag act gtg aaa ggg gca agc gca Leu Ile Phe Pro Glu Ser Leu Thr Gln Thr Val Lys Gly Ala Ser Ala 195 200 205 | 624 |
| gtg gcg cag gtg gtc ctc ggc ttc gcg ctc cct ctg ggc gtc atg gca Val Ala Gln Val Val Leu Gly Phe Ala Leu Pro Leu Gly Val Met Ala 210 215 220 | 672 |

gcc tgt tat gcg ctc ctg ggc cgc acg ctt ctg gcc gcc agg ggg cca 720
 Ala Cys Tyr Ala Leu Leu Gly Arg Thr Leu Leu Ala Ala Arg Gly Pro
 225 230 235 240

gag cgg cgg cgt gca ctg cgc gtc gtg gtg gct ttg gtg gtg gcc ttc 768
 Glu Arg Arg Arg Ala Leu Arg Val Val Val Ala Leu Val Val Ala Phe
 245 250 255

gtg gtg ctg cag ttg ccc tac agc ctt gcc ctg ctg ctg gat aca gcc 816
 Val Val Leu Gln Leu Pro Tyr Ser Leu Ala Leu Leu Leu Asp Thr Ala
 260 265 270

gat cta ctg gca gcc cgc gag cgg agc tgc tcc tcc agc aag cgc aag 864
 Asp Leu Leu Ala Ala Arg Glu Arg Ser Cys Ser Ser Ser Lys Arg Lys
 275 280 285

gat cta gct ttg ctg gtc acc ggc ggc ttg acc ctg gtc cgt tgc agc 912
 Asp Leu Ala Leu Leu Val Thr Gly Gly Leu Thr Leu Val Arg Cys Ser
 290 295 300

ctc aat ccg gtg ctt tat gcc ttt ttg ggc ctg cgt ttc cgc cgg gac 960
 Leu Asn Pro Val Leu Tyr Ala Phe Leu Gly Leu Arg Phe Arg Arg Asp
 305 310 315 320

ctg cgg agg ctg ctc cag ggc gga gga tgc agc ccg aag ccc aac cct 1008
 Leu Arg Arg Leu Leu Gln Gly Gly Gly Cys Ser Pro Lys Pro Asn Pro
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cgt ggc cgc tgc ccc cgt cga ctc cgc ctt tct tcc tgc tct gct cct 1056
 Arg Gly Arg Cys Pro Arg Arg Leu Arg Leu Ser Ser Cys Ser Ala Pro
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act gag acc cac agt ctc tct tgg gac aac tag 1089
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Tyr Asp Glu Glu Ala Tyr Ser Val Gly Pro Leu Pro Glu Leu Cys Tyr
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Lys Ala Asp Val Gln Ala Phe Ser Arg Ala Phe Gln Pro Ser Val Ser
 35 40 45

Leu Met Val Ala Val Leu Gly Leu Ala Gly Asn Gly Leu Val Leu Ala
 50 55 60

Thr His Leu Ala Ala Arg Arg Thr Thr Arg Ser Pro Thr Ser Val His

| | | | | | | | | | | | | | | | |
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| 65 | | | | | 70 | | | | | | 75 | | | | 80 |
| Leu | Leu | Gln | Leu | Ala | Leu | Ala | Asp | Leu | Leu | Leu | Ala | Leu | Thr | Leu | Pro |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Phe | Ala | Ala | Ala | Gly | Ala | Leu | Gln | Gly | Trp | Asn | Leu | Gly | Ser | Thr | Thr |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Cys | Arg | Ala | Ile | Ser | Gly | Leu | Tyr | Ser | Ala | Ser | Phe | His | Ala | Gly | Phe |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Leu | Phe | Leu | Ala | Cys | Ile | Ser | Ala | Asp | Arg | Tyr | Val | Ala | Ile | Ala | Arg |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Ala | Leu | Pro | Ala | Gly | Gln | Arg | Pro | Ser | Thr | Pro | Ser | Arg | Ala | His | Leu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Val | Ser | Val | Phe | Val | Trp | Leu | Leu | Ala | Leu | Phe | Leu | Ala | Leu | Pro | Ala |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Leu | Leu | Phe | Ser | Arg | Asp | Gly | Pro | Arg | Glu | Gly | Gln | Arg | Arg | Cys | Arg |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Leu | Ile | Phe | Pro | Glu | Ser | Leu | Thr | Gln | Thr | Val | Lys | Gly | Ala | Ser | Ala |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Val | Ala | Gln | Val | Val | Leu | Gly | Phe | Ala | Leu | Pro | Leu | Gly | Val | Met | Ala |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Ala | Cys | Tyr | Ala | Leu | Leu | Gly | Arg | Thr | Leu | Leu | Ala | Ala | Arg | Gly | Pro |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Glu | Arg | Arg | Arg | Ala | Leu | Arg | Val | Val | Val | Ala | Leu | Val | Val | Ala | Phe |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Val | Val | Leu | Gln | Leu | Pro | Tyr | Ser | Leu | Ala | Leu | Leu | Leu | Asp | Thr | Ala |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Asp | Leu | Leu | Ala | Ala | Arg | Glu | Arg | Ser | Cys | Ser | Ser | Ser | Lys | Arg | Lys |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Asp | Leu | Ala | Leu | Leu | Val | Thr | Gly | Gly | Leu | Thr | Leu | Val | Arg | Cys | Ser |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Leu | Asn | Pro | Val | Leu | Tyr | Ala | Phe | Leu | Gly | Leu | Arg | Phe | Arg | Arg | Asp |
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Leu Arg Arg Leu Leu Gln Gly Gly Gly Cys Ser Pro Lys Pro Asn Pro
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Thr Glu Thr His Ser Leu Ser Trp Asp Asn
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Gln Gln Arg Gly Leu Ala Ile Val Ala Leu Ala Val Cys Ala Ala Leu
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cat gcc tca gaa gcc ata ctt ccc att gcc tcc agc tgt tgc acg gag 154
His Ala Ser Glu Ala Ile Leu Pro Ile Ala Ser Ser Cys Cys Thr Glu
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gtt tca cat cat att tcc aga agg ctc ctg gaa aga gtg aat atg tgt 202
Val Ser His His Ile Ser Arg Arg Leu Leu Glu Arg Val Asn Met Cys
15 20 25

cgc atc cag aga gct gat ggg gat tgt gac ttg gct gct gtc atc ctt 250
Arg Ile Gln Arg Ala Asp Gly Asp Cys Asp Leu Ala Ala Val Ile Leu
30 35 40

cat gtc aag cgc aga aga atc tgt gtc agc ccg cac aac cat act gtt 298
His Val Lys Arg Arg Arg Ile Cys Val Ser Pro His Asn His Thr Val
45 50 55

aag cag tgg atg aaa gtg caa gct gcc aag aaa aat ggt aaa gga aat 346
Lys Gln Trp Met Lys Val Gln Ala Ala Lys Lys Asn Gly Lys Gly Asn
60 65 70 75

gtt tgc cac agg aag aaa cac cat ggc aag agg aac agt aac agg gca 394
Val Cys His Arg Lys Lys His His Gly Lys Arg Asn Ser Asn Arg Ala
80 85 90

cat cag ggg aaa cac gaa aca tac ggc cat aaa act cct tat 436
His Gln Gly Lys His Glu Thr Tyr Gly His Lys Thr Pro Tyr
95 100 105

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ttgtcctgca tactgatgaa actactgatg tcvgctggtc tgaaaggacc taccagaagc 556

taaattctcca agaatgccat ttcctatcc ctaatgatcc aatctccctt accctgacca 616

atcagtggcc caaattttcc agccccttgc ctcccagaac cccagcccag aactcttcag 676

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Glu Val Ser His His Ile Ser Arg Arg Leu Leu Glu Arg Val Asn Met
15 20 25

Cys Arg Ile Gln Arg Ala Asp Gly Asp Cys Asp Leu Ala Ala Val Ile
30 35 40

Leu His Val Lys Arg Arg Arg Ile Cys Val Ser Pro His Asn His Thr
45 50 55

Val Lys Gln Trp Met Lys Val Gln Ala Ala Lys Lys Asn Gly Lys Gly
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Asn Val Cys His Arg Lys Lys His His Gly Lys Arg Asn Ser Asn Arg

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85

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Ala His Gln Gly Lys His Glu Thr Tyr Gly His Lys Thr Pro Tyr
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 Ile Tyr Trp Gly Cys Phe Tyr Phe Phe Pro Trp Leu Arg Met Trp Arg
 20 25 30
 agg gag cgg agt ccg atg tct cca aca agc cag aga cta agt ctg gaa 144
 Arg Glu Arg Ser Pro Met Ser Pro Thr Ser Gln Arg Leu Ser Leu Glu
 35 40 45
 gcc ccc agc ctc cca ctg aga agc tgg cat ccg tgg aac aag act aag 192
 Ala Pro Ser Leu Pro Leu Arg Ser Trp His Pro Trp Asn Lys Thr Lys
 50 55 60
 cag aag caa gaa gcc ttg cct ctg ccc tcc agc act agc tgc tgt act 240
 Gln Lys Gln Glu Ala Leu Pro Leu Pro Ser Ser Thr Ser Cys Cys Thr
 65 70 75 80
 cag ctc tat aga cag cca ctc cca agc agg ctg ctg agg agg att gtc 288
 Gln Leu Tyr Arg Gln Pro Leu Pro Ser Arg Leu Leu Arg Arg Arg Ile Val
 85 90 95
 cac atg gaa ctg cag gag gcc gat ggg gac tgt cac ctc cag gct gtc 336
 His Met Glu Leu Gln Glu Ala Asp Gly Asp Cys His Leu Gln Ala Val
 100 105 110
 gtg ctt cac ctg gct cgg cgc agt gtc tgt gtt cat ccc cag aac cgc 384
 Val Leu His Leu Ala Arg Arg Ser Val Cys Val His Pro Gln Asn Arg
 115 120 125
 agc ctg gct cgg tgg tta gaa cgc caa ggg aaa agg ctc caa ggg act 432
 Ser Leu Ala Arg Trp Leu Glu Arg Gln Gly Lys Arg Leu Gln Gly Thr
 130 135 140
 gta ccc agt tta aat ctg gta cta caa aag aaa atg tac tca aac ccc 480
 Val Pro Ser Leu Asn Leu Val Leu Gln Lys Lys Met Tyr Ser Asn Pro
 145 150 155 160
 caa cag caa aac taataaagca acattagacg acaaaaaaaaa aaaaaaaaaa 532
 Gln Gln Gln Asn

aaaaaaaaa a

543

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35 40 45

Ala Pro Ser Leu Pro Leu Arg Ser Trp His Pro Trp Asn Lys Thr Lys
50 55 60

Gln Lys Gln Glu Ala Leu Pro Leu Pro Ser Ser Thr Ser Cys Cys Thr
65 70 75 80

Gln Leu Tyr Arg Gln Pro Leu Pro Ser Arg Leu Leu Arg Arg Ile Val
85 90 95

His Met Glu Leu Gln Glu Ala Asp Gly Asp Cys His Leu Gln Ala Val
100 105 110

Val Leu His Leu Ala Arg Arg Ser Val Cys Val His Pro Gln Asn Arg
115 120 125

Ser Leu Ala Arg Trp Leu Glu Arg Gln Gly Lys Arg Leu Gln Gly Thr
130 135 140

Val Pro Ser Leu Asn Leu Val Leu Gln Lys Lys Met Tyr Ser Asn Pro
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Gln Gln Gln Asn

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ttt caa acc tca gaa gcc ata ctt ccc atg gcc tcc agc tgt tgc act 96
Phe Gln Thr Ser Glu Ala Ile Leu Pro Met Ala Ser Ser Cys Cys Thr
-5 -1 1 5 10

gag gtg tct cat cat gtt tcc gga aga ctt ctg gaa aga gtg agt tca 144
Glu Val Ser His His Val Ser Gly Arg Leu Leu Glu Arg Val Ser Ser
15 20 25

tgc agc atc cag aga gct gac ggg gac tgc gac ctg gct gct gtc atc 192
Cys Ser Ile Gln Arg Ala Asp Gly Asp Cys Asp Leu Ala Ala Val Ile
30 35 40

ctt cat gtt aaa cgt aga aga atc tgc atc agc ccg cac aat cgt act 240
Leu His Val Lys Arg Arg Arg Ile Cys Ile Ser Pro His Asn Arg Thr
45 50 55

ttg aag cag tgg atg aga gcc tca gag gta aag aag aat ggc aga gaa 288
Leu Lys Gln Trp Met Arg Ala Ser Glu Val Lys Lys Asn Gly Arg Glu
60 65 70

aac gtc tgt tct ggg aaa aaa caa ccc agc agg aag gac aga aaa ggg 336
Asn Val Cys Ser Gly Lys Lys Gln Pro Ser Arg Lys Asp Arg Lys Gly
75 80 85 90

cac act acg aga aag cac aga aca cgt gga aca cac agg cac gaa gcc 384
His Thr Thr Arg Lys His Arg Thr Arg Gly Thr His Arg His Glu Ala
95 100 105

tct cgt tag 393
Ser Arg

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<400> 10

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Phe Gln Thr Ser Glu Ala Ile Leu Pro Met Ala Ser Ser Cys Cys Thr
 -5 -1 1 5 10
 Glu Val Ser His His Val Ser Gly Arg Leu Leu Glu Arg Val Ser Ser
 15 20 25
 Cys Ser Ile Gln Arg Ala Asp Gly Asp Cys Asp Leu Ala Ala Val Ile
 30 35 40
 Leu His Val Lys Arg Arg Arg Ile Cys Ile Ser Pro His Asn Arg Thr
 45 50 55
 Leu Lys Gln Trp Met Arg Ala Ser Glu Val Lys Lys Asn Gly Arg Glu
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 His Thr Thr Arg Lys His Arg Thr Arg Gly Thr His Arg His Glu Ala
 95 100 105

Ser Arg

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 ctg agc cca gac cct aca gca gca ttc cta ctg cca ccc agc act gcc 96
 Leu Ser Pro Asp Pro Thr Ala Ala Phe Leu Leu Pro Pro Ser Thr Ala
 -5 -1 1 5
 tgc tgt act cag ctc tac cga aag cca ctc tca gac aag cta ctg agg 144
 Cys Cys Thr Gln Leu Tyr Arg Lys Pro Leu Ser Asp Lys Leu Leu Arg
 10 15 20

aag gtc atc cag gtg gaa ctg cag gag gct gac ggg gac tgt cac ctc 192
Lys Val Ile Gln Val Glu Leu Gln Glu Ala Asp Gly Asp Cys His Leu
25 30 35 40

cag gct ttc gtg ctt cac ctg gct caa cgc agc atc tgc atc cac ccc 240
Gln Ala Phe Val Leu His Leu Ala Gln Arg Ser Ile Cys Ile His Pro
45 50 55

cag aac ccc agc ctg tca cag tgg ttt gag cac caa gag aga aag ctc 288
Gln Asn Pro Ser Leu Ser Gln Trp Phe Glu His Gln Glu Arg Lys Leu
60 65 70

cat ggg act ctg ccc aag ctg aat ttt ggg atg cta agg aaa atg ggc 336
His Gly Thr Leu Pro Lys Leu Asn Phe Gly Met Leu Arg Lys Met Gly
75 80 85

tgaagcccca atagccaaat aataaa 362

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<400> 12

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Leu Ser Pro Asp Pro Thr Ala Ala Phe Leu Leu Pro Pro Ser Thr Ala
-5 -1 1 5

Cys Cys Thr Gln Leu Tyr Arg Lys Pro Leu Ser Asp Lys Leu Leu Arg
10 15 20

Lys Val Ile Gln Val Glu Leu Gln Glu Ala Asp Gly Asp Cys His Leu
25 30 35 40

Gln Ala Phe Val Leu His Leu Ala Gln Arg Ser Ile Cys Ile His Pro
45 50 55

Gln Asn Pro Ser Leu Ser Gln Trp Phe Glu His Gln Glu Arg Lys Leu
60 65 70

His Gly Thr Leu Pro Lys Leu Asn Phe Gly Met Leu Arg Lys Met Gly
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Leu Pro Leu Leu Leu Leu Leu Leu Ser Pro Ala Pro Glu Ala Ala Leu
-15 -10 -5 -1 1

cct ctg ccc tcc agc act agc tgc tgt act cag ctc tat aga cag cca 148
Pro Leu Pro Ser Ser Thr Ser Cys Cys Thr Gln Leu Tyr Arg Gln Pro
5 10 15

ctc cca agc agg ctg ctg agg agg att gtc cac atg gaa ctg cag gag 196
Leu Pro Ser Arg Leu Leu Arg Arg Ile Val His Met Glu Leu Gln Glu
20 25 30

gcc gat ggg gac tgt cac ctc cag gct gtc gtg ctt cac ctg gct cgg 244
Ala Asp Gly Asp Cys His Leu Gln Ala Val Val Leu His Leu Ala Arg
35 40 45

cgc agt gtc tgt gtt cat ccc cag aac cgc agc ctg gct cgg tgg tta 292
Arg Ser Val Cys Val His Pro Gln Asn Arg Ser Leu Ala Arg Trp Leu
50 55 60 65

gaa cgc caa ggg aaa agg ctc caa ggg act gta ccc agt tta aat ctg 340
Glu Arg Gln Gly Lys Arg Leu Gln Gly Thr Val Pro Ser Leu Asn Leu
70 75 80

gta cta caa aag aaa atg tac tca aac ccc caa cag caa aac 382
Val Leu Gln Lys Lys Met Tyr Ser Asn Pro Gln Gln Gln Asn
85 90 95

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-5 -1 1 5

Ser Cys Cys Thr Gln Leu Tyr Arg Gln Pro Leu Pro Ser Arg Leu Leu
10 15 20

Arg Arg Ile Val His Met Glu Leu Gln Glu Ala Asp Gly Asp Cys His
25 30 35

Leu Gln Ala Val Val Leu His Leu Ala Arg Arg Ser Val Cys Val His
40 45 50 55

Pro Gln Asn Arg Ser Leu Ala Arg Trp Leu Glu Arg Gln Gly Lys Arg
60 65 70

Leu Gln Gly Thr Val Pro Ser Leu Asn Leu Val Leu Gln Lys Lys Met
75 80 85

Tyr Ser Asn Pro Gln Gln Gln Asn
90 95

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atctggcacc acaccttcta caatgagctg cg 32

<210> 16
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cgtcatactc ctgcttgctg atccacatct gc 32